Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
FCC Notice of Proposed Rule Making	)	ET Docket No.: 18-295
Unlicensed Use of the 6 GHz Band	)	GN Docket No.: 17-183
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz.	)	

COMMENTS OF NXP USA, INC.

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COMMENTS OF NXP USA INC.

NXP Semiconductors ("NXP") provides the below comments in response to the Notice of Proposed Rulemaking ("NPR") in the above referenced proceedings in which the Federal Communications Commission (the "Commission") seeks input on potential WiFi services in the 5.925-7.125 GHz ("6 GHz") band.

NXP Semiconductors, a combination of the former semiconductor divisions of Philips and Motorola, is a semiconductor company with significant operations in the United States, Europe and Asia, built on more than 60 years of combined experience and expertise. NXP Semiconductors is the world's largest semiconductor supplier to the automotive industry and is the global leader in security technology and secure identification solutions in various markets including banking cards, secure car access, RF-ID and NFC markets. NXP has developed and is continuing to develop Ultra Wide Band ("UWB") Real-Time Location System ("RTLS") technology for its target applications.

In reference to paragraph 72 of the Notice of Proposed Rule Making:

Within the 6 GHz band, NXP has developed, at great financial expense over several years of R&D, state-of-the-art RTLS technology targeted for sale in the market verticals noted above. We have concluded that UWB systems, operating under the existing provision in Part 15 FCC PART 15 Subpart C Section 15.250, and/or under Subpart F, provide distance measurement and localization and positioning performance that is unique among radio systems and therefore best suited as the basis for our RTLS products. It is our understanding that several companies in this field have observed similar benefits of UWB technology and are advocating continued use of such technology.

The unique distance measurement and localization and positioning performance of UWB systems, specifically, the high distance measurement accuracy combined with high measurement update rates and short radio messages and associated low measurement latency, is well known among experts. As UWB RTLS technology is typically able to operate in indoor environments, UWB is a natural choice to complement Global Positioning System ("GPS") technology, where GPS is typically limited to outdoor environments.

The IEEE 802.15.4z standard is under development, nearing completion, with NXP being one of its main contributors. This new standard will allow a completely new breed of applications relying on accurate and secure distance measurement between UWB devices. The field of applications is developing very quickly and the expected potential value to society, though too early to be fully assessed, will be profound.

The first deployment of the IEEE 802.15.4z standard is imminent and will use the 6 GHz spectrum, where an IEEE 802.15.4z compliant device will typically operate in the UWB channel covering 6239.6-6739.6 MHz. The power levels and duty cycles foreseen are such that disturbance of incumbent licensed services operating in the 6 GHz band is not expected. The designation of the 6 GHz band under the new proposed FCC rulemaking as unlicensed spectrum is also a testament to the lack of interference between services operating unlicensed under FCC PART 15 Subpart C Section 15.250, and/or under Subpart F and incumbent licensed services in this band.

However, the designation of the 6 GHz band as an unlicensed band with the proposed maximum EIRP power spectral density limits does create a very high risk of interference between the projected WiFi deployment in this band and the new UWB secure ranging applications. Specifically, when a nearby Wifi station operating in or close to the

projected UWB band is transmitting, the transmission creates such a high disturbance on UWB secure ranging receivers that in effect no reception at all is possible.

There are two options to overcome this issue.

Our first suggestion is to limit both power levels and duty cycle of any station operating in the 6 GHz band. We propose that an unlicensed transmitter adhere to a maximum EIRP power spectral density limit of -21.3 dBm/MHz in-band and -41.3 dBm/MHz in any of the adjacent channels, and a duty cycle limit of 0.5% measured in a 1 second interval. By limiting the power levels and duty cycle of WiFi stations to the proposed levels, nearby UWB applications will be able to have sufficiently reliable access to the spectrum to be able to function properly and other nearby WiFi stations will have more reliable access to the spectrum.

Our second suggestion is to designate a spectrum access mechanism for all unlicensed stations in the band ensuring open access according to equitable allocation conditions. One option, the direct method, is to designate a specific header transmission preceding any transmission using a different format, reserving the required spectrum for a suitable duration. The second mechanism, a reservation mechanism, would be for a UWB (or other) station to detect beacon transmissions of a WiFi (or other types of) access point operating in the 6 GHz band and to send a spectrum reservation message to that access point in an agreed protocol. The access point can then adapt its spectrum access coordination to stations under its control and possibly return a message to the UWB (or other) station with the spectrum reservation which was made. It may also be possible to forego the beacon message detection by the UWB station and simply send the spectrum reservation mechanism using a power level that is acceptable for such purpose assuming it

will make a suitable reservation. The access point reservation could take the form of a maximum duty cycle for all stations and a specific limit on its own duty cycle or take a more sophisticated or tailored form.

In conclusion, NXP recommends that the FCC establish spectrum access rules for the 6 GHz band, such that UWB secure ranging (IEEE 802.15.4z) and possibly other alternative radio applications can operate with acceptable interference.